IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	David Fifield		
Assignee:	Broadcom Corporation		
Title:	Antenna Configuration for Wireless Communication Device		
Serial No.:	10/810,112	Filed:	March 26, 2004
Examiner:	Matthew C. Sams	Group Art Unit:	2617
Docket No.:	BP 3208	Customer No.:	34399

April 9, 2007

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF UNDER 37 CFR § 41.37

Dear Sir:

Applicant submits this Appeal Brief pursuant to the Notice of Appeal filed in this case on January 3, 2007. The fee for this Appeal Brief is being paid via the USPTO EFS. The Board is also authorized to deduct any other amounts required for this appeal brief and to credit any amounts overpaid to Deposit Account No. 502264.

I. REAL PARTY IN INTEREST - 37 CFR § 41.37(c)(1)(i)

The real party in interest is the assignee, Broadcom Corporation, as named in the caption above and as evidenced by the assignment set forth at Reel 015152, Frame 0646.

II. RELATED APPEALS AND INTERFERENCES - 37 CFR § 41.37(c)(1)(ii)

Based on information and belief, there are no appeals or interferences that could directly affect or be directly affected by or have a bearing on the decision by the Board of Patent Appeals and Interferences in the pending appeal.

III. STATUS OF CLAIMS - 37 CFR § 41.37(c)(1)(iii)

Claims 1 – 20 are pending in the application. Claims 1 - 20 stand rejected. The rejection of claims 1 – 20 is appealed. Appendix "A" contains the full set of pending claims.

IV. STATUS OF AMENDMENTS - 37 CFR § 41.37(c)(1)(iv)

On May 23, 2006, Applicant filed a Response to Non-final Office Action. In that response, independent claims 1 and 11 were amended. No other amendments to the claims have been submitted.

V. SUMMARY OF CLAIMED SUBJECT MATTER - 37 CFR § 41.37(c)(1)(v)

Applicant's invention relates to a communication system and method for providing dual band wireless communications. The subject matter defined in independent claims 1 and 11 may be understood with reference to the example embodiments shown in Figures 3 and 5. First and second transceivers, e.g., transceivers 41 and 61 in Figure 3, are operable to communicate using radio frequency (RF) signals at first and second frequencies, respectively. A first pair of antenna elements, e.g., antenna elements 162a and 162b shown in Figure 5, are used to transmit and receive RF signals at the first frequency. A second pair of antenna elements, e.g., elements 164a and 164b shown in Figure 5, are used to transmit and receive RF signals at the second frequency. As described in the specification on page 17, paragraph 44, the antenna elements are connected to a diversity switch and are oriented to optimize spatial diversity as recited in independent claims 1 and 11. In particular, as further described in paragraph 44 of the specification, spatial diversity can be optimized by orienting selected pairs of antenna elements so that they are orthogonal with respect to each other.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL - 37 CFR § 41.37(c)(1)(vi)

The question submitted for review is whether claims 1 – 20 are properly rejected under 35 U.S.C. § 103(a), as being unpatentable over Publication No. 2004/0198420 to He in view of Publication No. 2003/0146876 to Greer.

VII. ARGUMENT - 37 CFR § 41.37(c)(1)(vii)

In summary, Applicant respectfully submits that the rejection of claims 1-20 under 35 U.S.C. §103(a) in the Final Office Action should be removed because the proposed combination of He and Greer does not provide all of the limitations recited in independent claims 1 and 11.

Independent claims 1 and 11 recite a first pair of antenna elements for transmitting and receiving RF signals at a first frequency and a second pair of antenna elements for transmitting and receiving RF signals at a second frequency.

The He reference discloses a dual-mode wireless transceiver having a first antenna and a second antenna disposed at different locations on a laptop computer. However, as stated by Examiner on page 5 of the Final Office Action, the He reference does not disclose first and second pairs of antenna elements operable to receive and transmit RF signals at first and second frequencies, as recited in independent claims 1 and 11. Examiner seeks to supply this missing limitation by combining the teachings of the Greer reference with the teachings of the He reference.

On page 2 of the Final Office Action, Examiner observes that Greer recites (on page 8, claim 17) "a first pair of antennas having different signal polarization characteristics" and a "second pair of antennas having different radiation pattern characteristics." Examiner then refers to statements in Greer (in the Background section) regarding the frequencies used in the IEEE a/b/g standard. Examiner then states "[t]herefore, Greer teaches a first and second pair of antennas for transmitting and receiving signals at a first frequency and a second frequency. In fact, there is no technical basis for Examiner's assertion. Thus, the cited portions of Greer, combined with He, fail to provide a basis for rejecting independent claims 1 and 11.

As is well understood by those of skill in the art, "polarization" refers to the orientation of the electric field, or "E" plane, of an electromagnetic wave. Those of skill in the art would interpret a "radiation pattern" of an antenna to refer to the directional (angular) dependence of electromagnetic radiation emitted by an antenna. The recitation of these features in claim 17 of the Greer reference does not provide a teaching of a first pair of antenna elements for transmitting and receiving RF signals at a first frequency and a second pair of antenna elements for transmitting and receiving RF signals at a second frequency, as recited in Applicant's independent claims 1 and 11. The mere reference to the well known IEEE 802.11 a/b/g standard frequencies in the Background section of the Greer reference does not provide a basis to assert that the features recited in claim 17 of Greer provides a teaching of first and second antenna pairs operable to transmit and receive signals at first and second frequencies.

For the reasons set forth above, the combination of Greer and He fails to disclose the limitation recited in independent claims 1 and 11 of "first and second pairs" of individual antenna elements for transmitting at first and second frequencies. It is apparent that the combination of He and Greer fails to anticipate independent claims 1 and 11 and, therefore, the rejection of claims 1 and 11 under 35 U.S.C. §103(a) should be removed.

For the reasons set forth above, independent claims 1 and 11 are allowable over the proposed combination of He and Greer and, therefore, the rejection of these claims under 35 U.S.C. §103(a) should be removed. Furthermore, dependent claims 2-10 and 12-20 are allowable since they are dependent from allowable base claims.

VIII. CLAIMS APPENDIX - 37 CFR § 41.37(c)(1)(viii)

A copy of the pending claims involved in the appeal is attached as Appendix A.

IX. EVIDENCE APPENDIX - 37 CFR § 41.37(c)(1)(ix)

None.

X. RELATED PROCEEDINGS APPENDIX - 37 CFR § 41.37(c)(1)(x)

None.

XI. CONCLUSION

For the reasons set forth above, Applicant respectfully submits that rejection of pending Claims 1 – 20 is unfounded, and requests that the rejection of claims 1 - 20 be reversed.

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Respectfully submitted,

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CLAIMS APPENDIX - 37 CFR § 41.37(c)(1)(viii) - APPENDIX A

1. A communication system for providing dual band wireless communications comprising:

a first radio transceiver operable to communicate using RF signals at a first frequency;

a second transceiver operable to communicate using RF signals at a second frequency;

a first pair of antenna elements for transmitting and receiving RF signals at said first frequency;

a second pair of antenna elements operable for transmitting and receiving RF signals at said second frequency; and

a diversity switch operably connected to said first and second transceivers and said first and second pairs of antenna elements, said diversity switch being operable to selectively direct RF signals at said first frequency between said first transceiver and said first pair of antenna elements and to direct RF signals at said second frequency between said second transceiver and said second pair of antenna elements;

wherein said first and second transceivers, said diversity switch and said first and second pairs of antenna elements are disposed on a circuit board whereby said individual elements of said first and second pair of antenna elements are disposed on said circuit board to optimize spatial diversity of said individual elements to optimize reception of said RF signals at said first and second frequencies.

2. The communication system according to claim 1, wherein said circuit board has first and second ends and first and second sides, wherein said individual elements of said first pair of antenna elements are disposed on said first end of said circuit board on opposite sides thereof and said second pair of antenna elements is disposed at said first end of said circuit board at opposite sides thereof.

3. The communication system according to claim 2, wherein said circuit board further comprises a ground plane disposed between said individual antenna elements on opposite sides of said circuit board.

4. The communication system according to claim 3, wherein said first and second elements of said first pair of antenna elements are oriented to maximize polarization diversity to optimize transmission and reception of said RF signals.

5. The communication system according to claim 4, wherein said first and second antenna elements are disposed on said circuit board with an orientation whereby said first and second antenna elements of said first and second pair are orthogonal with respect to each other.

6. The communication system according to claim 3, wherein said first and second elements of said second pair of antenna elements are oriented to maximize polarization diversity to optimize transmission and reception of said RF signals.

7. The communication system according to claim 4, wherein said first and second antenna elements of said second pair of antenna elements are disposed on said circuit board with an orientation whereby said first and second antenna elements of said second pair are orthogonal with respect to each other.

8. The communication system according to claim 5 wherein said first pair of antenna elements is optimized to operate at 2.4 GHz.

9. The communication system according to claim 7 wherein said second pair of antenna elements is optimized to operate at 5 GHz.

10. The communication system according to claim 5, wherein said circuit board having said first and second transceiver, said diversity switch and said first and second pair of antenna elements disposed thereon is housed in a PCMCIA module.

11. A method of providing dual band wireless communications comprising:

generating an RF signal at a first frequency using a first transceiver;

generating a second RF signal at a second frequency using a second transceiver;

using a diversity switch to selectively route said first RF signal at said first frequency to a first pair of antenna elements and to route said second RF signal at said second frequency to a second pair of antenna elements;

wherein said first and second transceivers, said diversity switch and said first and second pairs of antenna elements are disposed on a circuit board whereby said individual elements of said first and second pair of antenna elements are disposed on said circuit board to optimize spatial diversity of said individual elements to optimize reception of said RF signals at said first and second frequencies.

12. The method according to claim 11, wherein said circuit board has first and second ends and first and second sides, wherein said individual elements of said first pair of antenna elements are disposed on said first end of said circuit board on opposite sides thereof and said second pair of antenna elements is disposed at said first end of said circuit board at opposite sides thereof.

13. The method according to claim 12, wherein said circuit board further comprises a ground plane disposed between said individual antenna elements on opposite sides of said circuit board.

14. The method according to claim 13, wherein said first and second elements of said first pair of antenna elements are oriented to maximize polarization diversity to optimize transmission and reception of said RF signals.

15. The method according to claim 14, wherein said first and second antenna elements are disposed on said circuit board with an orientation whereby said first and second antenna elements of said first and second pair are orthogonal with respect to each other.

16. The method according to claim 15, wherein said first and second elements of said second pair of antenna elements are oriented to maximize polarization diversity to optimize transmission and reception of said RF signals.

17. The method according to claim 16, wherein said first and second antenna elements of said second pair of antenna elements are disposed on said circuit board with an orientation whereby said first and second antenna elements of said second pair are orthogonal with respect to each other.

18. The method according to claim 17, wherein said first pair of antenna elements is optimized to operate at 2.4 GHz.

19. The method according to claim 18, wherein said second pair of antenna elements is optimized to operate at 5 GHz.

20. (Original) The method according to claim 19, wherein said circuit board having said first and second transceiver, said diversity switch and said first and second pair of antenna elements disposed thereon is housed in a PCMCIA module.

EVIDENCE APPENDIX - 37 CFR § 41.37(c)(1)(ix)

None.

RELATED PROCEEDINGS APPENDIX - 37 CFR § 41.37(c)(1)(x)

There are no related proceedings.